

# Prevalence of Modifiable Risk Factors of Falls in Post-operative Elderly

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## ABSTRACT

**Introduction:** Falls are very common in elderly individuals. Falls are the accounting for morbidity and mortality. Falls are one of the major reasons in the elderly for hospitalization. Falls may lead to disability and sometimes patient may become handicap. Large number of elderly populations in rural as well as urban suffering from this problem. Many studies done on causes of falls. However, very less research is done on the prevalence of modifiable risk factors of falls in post-operative elderly individuals. Hence, there is a need to find out the modifiable risk factors which people can alter to reduce risk of fall. **Aims and Objectives:** This study aims to study and find out the prevalence of modifiable risk factors of falls in post-operative elderly individuals. **Materials and Methods:** This was an observational study with a total of 100 participants. The participants were elderly individuals who had a fall and underwent surgery for fracture correction. Both male and female age groups above 60 years old were selected for the study. Participants were selected from Krishna Hospital, Karad. Outcome measures were included visual examination, balance test, manual muscle testing, goniometry, and neurological examination. **Results:** The results have shown that the highest risk factor for falls is due to slippery floor (21%) followed by falls during toilet activities (14%). It can be seen that poor balance (13%), reduced strength of muscles (11%), and reduced range of motion (9%) also play a key role in being a risk factor for falls. The figure depicts other factors such as poor lighting (7%), climbing up and down the stairs (6%), improper foot wear (5%), and obesity (4%) is also responsible for falls in the elderly. Lack of use of assistive devices (4%), gait deficit (3%), wrong exercise habits (2%), and clothing (1%) also are some risk factors for falls to some extent. **Conclusion:** This study concludes that falls due to slippery floors are one of the most common occurrences followed by falls during toilet activities and due to poor balance. Other modifiable risk factors for falls include reduced strength of muscles, reduced range of motion, improper foot wear, clothing, gait deficit, climbing up or down the stairs, obesity, poor lighting, wrong exercise habits, and lack of use of assistive devices. It is of utmost importance to identify the modifiable risk factors in the elderly to prevent injuries and improve quality of life of the elderly.

**Keywords:** Balance impairments, Modifiable risk factors of fall, Muscle weakness, Obesity, Postoperative complications, Reduced functional mobility

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## INTRODUCTION

One of the major causes of injuries and disabilities in the elderly occur due to falls. Literature shows that approximately 30% of individuals above 65 years of age have a history of falls.<sup>[1,2]</sup> In the past, studies have been conducted to identify the various risk factors of falls. However, this study focuses on identifying the risk factors that can be modifiable and help prevent falls as well as improve the quality of life of the elderly.

Following are some of the risk factors which can be mainly classified into two groups, they are personal and environmental factors. In personal factors such as, reduced range of motion and muscle strength, impaired vision, balance impairment, gait abnormalities, sensory loss, postural hypotension, leg length discrepancy, dementia. And environmental (extrinsic) factors such as, poor lighting, slippery surface, obstacles, no safety equipment, loose carpets, polypharmacy. Falls in geriatric individuals may cause fracture and complication of fracture, which may ultimately lead to death of the individuals.<sup>[2]</sup> Many serious injuries happen due to falls such as hip fracture is more common in that and about 75% of hip fracture patients will not regain their previous function of daily routine life. Some others serious injuries are also there such as depression, head injuries, pain, and restriction of mobility.

In another way, the fear of falling is particular problem in elderly population. Patients who fall previously often limit their activity and that which can be led to declining of overall functional, muscle weakness, disability, and risk of further fall. Falls may cause

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during bathing, getting up from chair or sofa or bed, climbing stairs or descending down on stairs, and picking object from floor.

In rural areas, people are not aware about disabilities which may result from falls. As having some financial problems in rural areas, the people built their home by their own so the improper architectural fractures are one of the major and common factors for fall in elderly individuals. Due to lack of awareness and medical services, in rural areas, many people suffer from complication of falls. Earlier studies were done on causes of falls and various risk factors for falls but the modifiable risk factors of falls in

post-operative elderly individuals are not done yet, so we have identified the modifiable risk factors of falls for the same. Thus, identifying the modifiable risk factors for fall will help to effectively prevent falls.

As age advances some degenerative changes start taking place in musculoskeletal system, cardiorespiratory system also neurological system declining. Some patients may experience reducing special senses such as visual activities, hearing, taste, smell, touch, and vestibular system which can also may cause falls.<sup>[3,4]</sup> Elderly people may experience decreased muscle power and reduced joint range, there are certain things which may lead to falls like environmental.<sup>[5,6]</sup> Prevention and management of falls have become important part of health-care profession. As it may cause disability and loss of independence.

The most common fall-related injuries are osteoporotic fracture.<sup>[7]</sup> Falls may cause fracture of neck of femur, Colles' fracture, intertrochanteric fracture of femur, supracondylar fracture, humeral shaft fracture, etc.<sup>[8]</sup> Due to fall, patient experiences mental stress, burden on other family members.<sup>[9]</sup> Cost of hospitalization and treatment of fracture and other soft-tissue injuries affect widely on financial status of patients,<sup>[10]</sup> many patients are facing problems while doing day-to-day activities.<sup>[11]</sup> The overall functional capacity of an individual is reduced and the ability to perform the basic activities of daily life is reduced.<sup>[12]</sup>

Due to lack of awareness and medical services, in rural area, many people suffer from complication of falls.<sup>[13]</sup> Earlier studies were done on causes of falls in the elderly but the modifiable risk factors in post-operative elderly individuals are not studied yet, so we have identified modifiable risk factors in post-operative individuals. Thus, understanding the modifiable risk factors in post-operative elderly individuals will help to intervene effectively to prevent falls.

Physiotherapy plays an important role in elderly individuals in an order to improve the quality of life and functional activities. They reduce the chances of falls in the elderly by improving or modifying risk factors. Physiotherapist also can work on avoidable causes of fall such as range of motion of joint, gait pattern, balance and coordination training, and improved muscle strength in elderly individuals. This will help to reduce in risk of falling.

## MATERIALS AND METHODS

### Procedure

Ethical (Protocol number 0131/2019-2020) approval was taken from the Institutional Ethical Committee, permission from respective authorities was taken (Ethical approval letter KIMSDU/IEC/06/2019). After ethical approval, the procedure began. The study was conducted in the duration of 6 months in Karad, Maharashtra, India. The study procedure is as follows:

### Outcome Measures

1. Romberg test
2. Standing in normal comfortable position
3. Single leg stance
4. Standing feet together
5. Stair climbing without handrails
6. Forward steps and backwards step
7. Structured questionnaire.

### Statistical Analysis

The outcome measures were assessed at the baseline. The collected data in this study were statistically analyzed using descriptive statistics as pie chart and percentages. For modifiable risk factors Figure 1. For final results were calculated in the form of percentages (%).

## RESULTS

### Modifiable Risk Factors [Figure 1]

#### Interpretation

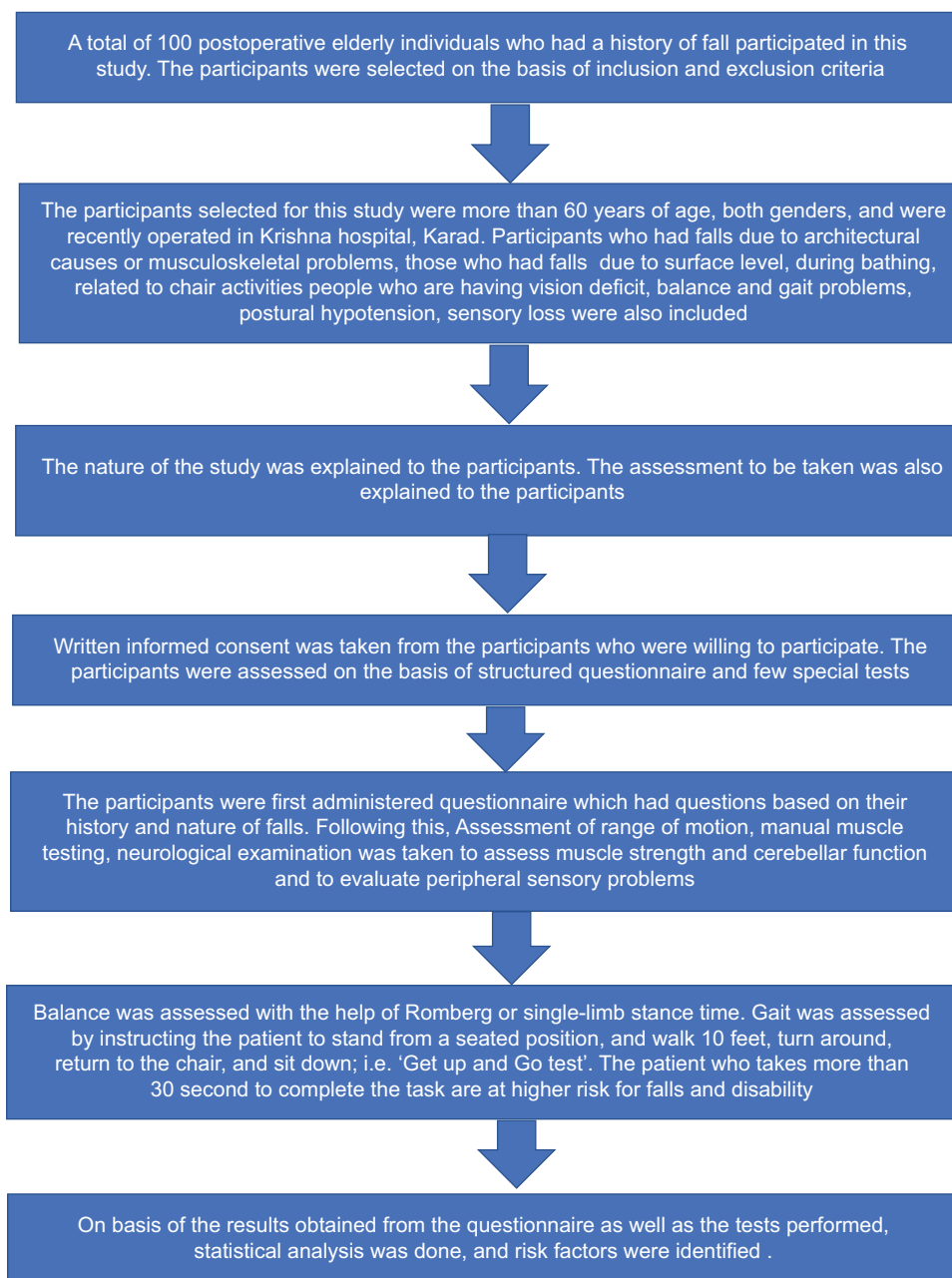
Figure 1 shows the results of our study. The study was conducted among 100 participants who were selected on the basis of inclusion and exclusion criteria. Table 1 shows that the highest risk factor for falls is due to slippery floor (21%) followed by falls during toilet activities (14%). It can be seen that poor balance (13%), reduced strength of muscles (11%), and reduced range of motion (9%) also play a key role in being a risk factor for falls. The figure depicts other factors such as poor lighting (7%), climbing up and down the stairs (6%), improper foot wear (5%), and obesity (4%) is also responsible for falls in elderly. Lack of use of assistive devices (4%), gait deficit (3%), wrong exercise habits (2%), and clothing (1%) also are some risk factors for falls to some extent.

#### Demographic variables

Table 2 shows that various factors are associated with the overall physical functioning of post-operative elderly.

## DISCUSSION

Falls are considered to be one of the major causes on injuries in elderly population. The elderly more commonly the population which has recently undergone certain operative procedures are at a high of falls. Falls can result in injuries to the individual as well as cause loss of confidence in the individual which, in turn, can hamper the quality of life of the said individual. Falls can lead to disability, which, in turn, can lead to psychological stress as well as cause financial burden on the individual and his family. Balance control is an important aspect which is responsible for maintaining the body's equilibrium. Falls occur when the balance control of body is impaired since the body's equilibrium is also affected. Systemic changes occur in the body as age progresses. Osteoporosis is one of the common reasons for causing fractures such as hip, knee, and ankle.<sup>[7]</sup> Some fractures may result into severe complications such as hypovolemic shock, deep vein thrombosis, and malunion.<sup>[8]</sup> In geriatric population, falls are the most common reason for disability.<sup>[14]</sup> In the past, studies have been conducted to assess the risk factors for falls in the elderly, but the modifiable risk factors for falls in post-operative elderly individuals are not done yet<sup>[15-17]</sup>. Hence, we selected this topic to find out the modifiable risk factors in them. Hence, this study was conducted among post-operative individuals who are above 60 years of age. The risk factors selected for this study are the ones which are encountered in our daily lives and which can be modified to prevent falls. These include slippery floors, poor balance, climbing up or down the stairs, improper footwear, clothing, during toilet activities, gait



deficits, reduced strength of muscles, reduced range of muscles, obesity, and wrong exercise habits. Slippery floors can lead to loss of balance and proprioception which, in turn, can result in falls. Due to changes occurring in vestibular system with age, the balance of the individual becomes poor. Postoperatively, this balance further deteriorates and can result in falls. Poor balance can also affect the ability of the individual to climb up and down the stairs, hence, this also plays as one of the risk factors in falls. Improper footwear and clothing such as inadequate fitting or loose clothes can interfere with the individual's ability to perform activities. Improper footwear can lead to inadequate ground clearance which can result in tripping of the individuals and falls. Inadequate/loose fit clothing can cause the individual to fall as a result of tripping over the clothes. Reduced muscle strength as well as reduced range of motion can affect the ability of the individual

to carry the weight as well as improper foot mechanics which, in turn, may lead to a high risk of falls. By identifying the severity with which these risk factors can affect the target population, we can prevent falls and improve the quality of life of post-operative elderly. To assess the risk factors, questionnaire was used which noted information about the demographic variables such as name, age, gender, as well as the history and nature of falls was also included. Assessment of range of motion and manual muscle testing was done. Certain special tests were used to assess the gait and balance among the elderly. The study was concluded using statistics which were calculated in the form of percentage.

The other factors including altered, reduced range of motion, and low grade of muscle strength are also risk factors for fall. The elderly is at higher risk of falls. Falls may lead to injuries as well as disrupt the confidence of the patient. The elderly is considered to

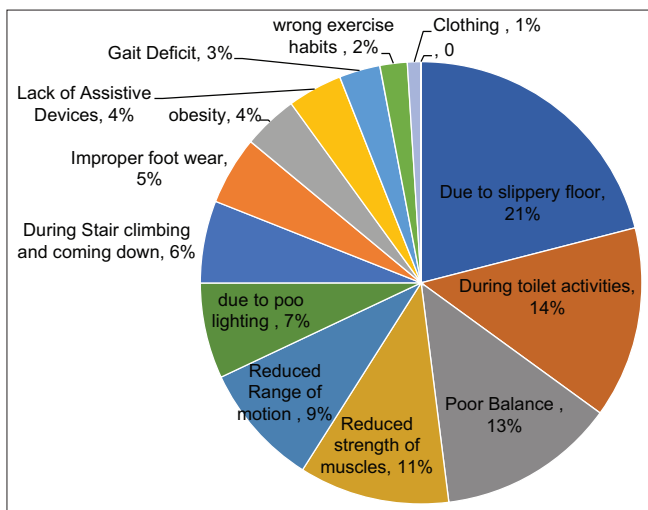


Figure 1: Modifiable risk factors

Table 1: Modifiable risk factors

Due to slippery floor	21% (n=12)
During toilet activities	14% (n=18)
Poor balance	13% (n=17)
Reduced strength of muscles	11% (n=12)
Reduced range of motion	9% (n=13)
Due to poor lighting	7% (n=9)
During stair climbing and coming down	6% (n=6)
Improper foot wear	5% (n=5)
Obesity	4% (n=4)
Lack of assistive devices	4% (n=4)
Gait deficit	3% (n=3)
Wrong exercise habits	2% (n=2)
Clothing	1% (n=1)

Table 2: Demographic variable

S. No.	Demographic variables	%
1	Age	
	60–65 years	42 (n=42)
	66–70 years	35 (n=35)
	70 above	23 (n=23)
2	Gender	
	Males	53 (n=53)
	Females	47 (n=47)
3	Obesity (BMI= >24.9 kg/m <sup>2</sup> )	37 (n=37)
4	Elderly who attended fall prevention program	0 (n=0)
5	Living area	
	Rural area	56 (n=56)
	Urban area	44 (n=44)
6	Elderly who are having diabetes mellitus	29 (n=29)
7	Elderly who are having hypertension	34 (n=34)
8	Elderly who are taking medications for thyroidism	4% (n=4)
9	Elderly who are alcohol addicted	36% (n=36)

be one of the high-risk groups for falls due to various causes such as improper balance, inadequate footwear, sensory impairments, and post-operative complications. It is of utmost importance to study the risk of falls in post-operative elderly which can help create awareness among the said population as well as preventive measures for falls and physiotherapy treatment strategies. Implementation of closed kinetic chain exercises,<sup>[18]</sup> By addressing strength and mobility impairments, one can avoid falls in the

elderly up to larger extent. And by avoiding falls economic burden of surgical procedures, complications such as pressure ulcers have been associated with an extended length of hospitalization, sepsis, and mortality,<sup>[19]</sup> complications of immobilization and bed rest can be avoided. Multicomponent<sup>[20]</sup> therapeutic exercise program,<sup>[21]</sup> conditioning program,<sup>[22]</sup> and activity specific spinal stabilization exercises<sup>[23]</sup> will further positively improve functional status and quality of life in the elderly.

## CONCLUSION

This study concludes that falls due to slippery floors are one of the most common occurrences followed by falls during toilet activities and due to poor balance. Other modifiable risk factors for falls include reduced strength of muscles, reduced range of motion, improper foot wear, clothing, gait deficit, climbing up or down the stairs, obesity, poor lighting, wrong exercise habits, and lack of use of assistive devices. It is of utmost importance to identify the modifiable risk factors in the elderly to prevent injuries and improve quality of life of the elderly.

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